ARBOVIRAL DISEASES

Last revised July 28, 2011

I. IDENTIFICATION

A. CLINICAL DESCRIPTION: Arboviral infection may be asymptomatic or result in a febrile illness of variable severity, sometimes associated with neurologic symptoms ranging from headache to aseptic meningitis and encephalitis. Arboviral encephalitis cannot be distinguished clinically from infection with other neurotropic viruses. Symptoms include fever, headache, confusion or other alterations in sensory, nausea, or vomiting. Signs may include evidence of elevated intracranial pressure, meningeal irritation, cranial nerve palsies, paresis or paralysis, altered reflexes or convulsions. Less common neurological syndromes can include cranial and peripheral neuritis/neuropathies, including Guillain-Barré syndrome. Arboviruses causing encephalitis include the following:

Mosquito-borne viruses occurring in the United States:

- West Nile virus (WNV)
- St. Louis encephalitis (SLEV)
- California encephalitis [California group includes La Crosse (LACV), Jamestown Canyon (JCV), Snowshoe Hare (SSHV), and California (CEV)]
- Eastern equine encephalitis (EEEV)
- Western equine encephalitis (WEEV)

Tickborne virus occurring in United States:

- Powassan encephalitis (POWV)

Mosquito-borne arboviruses associated with traveling to an endemic country:

- Dengue (DENV)
- Japanese encephalitis (JEV)
- Chikungunya (CHIKV)
- Other central nervous system infections transmitted by mosquitoes, ticks, or midges [Venezuelan equine encephalitis (VEEV), Cache valley encephalitis (CVV)]

These viruses may also cause non-neuroinvasive syndromes, most commonly manifesting as febrile illnesses. These are non-localized, self-limited illnesses with headache, myalgias, and arthralgias and sometimes accompanied by a skin rash or lymphadenopathy. Although rare, non-neuroinvasive syndromes caused by these viruses may also include myocarditis, pancreatitis or hepatitis. Laboratory confirmation of arboviral illnesses lacking a documented fever does occur, and overlap of the various clinical syndromes is common.

B. REPORTING CRITERIA: Laboratory evidence with a compatible clinical illness.

- Laboratories should report all positive test results
- Providers should report clinical information

C. CLINICAL CRITERIA FOR DIAGNOSIS: Clinical cases of arboviral disease are classified according to the following criteria:

- **Neuroinvasive** disease requires the presence of fever (≥100.4°F or 38°C) and at least one of the following signs and symptoms, as documented by a physician and in the absence of a more likely clinical explanation:
  - Acutely altered mental status (e.g., disorientation, confusion, memory deficit, stupor, coma),
  - Aseptic meningitis, encephalitis OR
  - Acute flaccid paralysis (AFP); AFP may result from anterior "polio" myelitis, peripheral neuritis, or post-infection peripheral demyelinating neuropathy (i.e. Guillain-Barré syndrome) OR
  - Stiff neck, seizures, limb weakness, sensory deficits, abnormal reflexes, abnormal movements, cranial nerve palsies OR
  - Pleocytosis (increased white blood cell count) in cerebrospinal fluid (CSF) or abnormal neuroimaging

- **Non-neuroinvasive** disease requires the presence of documented fever (≥100.4°F or 38°C), as measured by the patient or clinician, the absence of neuroinvasive disease (above), and the absence of a more likely clinical explanation for the illness. Signs and symptoms may include, fever, headache, stiff neck, myalgias, arthralgias, rash, lymphadenopathy, nausea or vomiting.

D. LABORATORY CRITERIA FOR CONFIRMATION: Cases of arboviral disease are classified according to the following laboratory criteria:

Confirmed result:

- Isolation of virus from or demonstration of specific viral antigen or nucleic acid in tissue, blood, CSF, or other body fluid, OR
- Fourfold or greater change in virus-specific quantitative antibody titers between acute (within 2 weeks after onset date) and convalescent sample (2-4 weeks after onset date), OR
- Virus-specific immunoglobulin M (IgM) antibodies in CSF or serum by antibody-capture enzyme immunoassay (Capture EIA) AND confirmed by demonstration of virus specific neutralizing antibodies in the same or later specimen (PRNT).

Probable result:

- Virus-specific IgM antibodies in CSF or serum detected by antibody-capture EIA but with no other testing in the same or later specimen.

Note: positive results from a single serologic test can be misleading because serologic cross-reactivity often occurs between closely related arboviruses (especially between SLE and WNV). It is therefore recommended that an arbovirus panel (which includes testing for WNV, SLE, LAC and EEE) be requested when there is clinical suspicion of arboviral disease, rather than requesting individual tests. Powassan virus testing at CDC may be added to the arbovirus panel if patient exhibits signs and symptoms including confusion, memory loss, speech difficulty, change in mental status, encephalitis, or meningitis. For more information on how to order Powassan virus testing, please contact the Vectorborne Epidemiologist.

Arboviral transmission varies according to local climatic conditions and West Nile virus-specific IgM antibody can be detectable for more than a year following infection. Therefore, the importance of a recent travel history and thorough serologic testing cannot be

overemphasized. IgG antibody can be detected throughout a person's lifetime after an infection. Thus, a positive IgG and a negative IgM may indicate previous infection at some point in time.

E. WISCONSIN CASE DEFINITION: An illness is classified as a case if it meets one or more of the above clinical criteria, **AND** one or more of the above laboratory criteria, **AND** occurred when and where there is a high likelihood of vector activity.

II. ACTIONS REQUIRED / PREVENTION MEASURES

A. WISCONSIN DISEASE SURVEILLANCE CATEGORY II:
Report to the patient's local health department either electronically through the Wisconsin Electronic Disease Surveillance System (WEDSS), by mail or fax using an Acute and Communicable Disease Case Report (F-44151), or by other means within 72 hours upon recognition of a case or suspected case.

B. EPIDEMIOLOGY REPORTS REQUIRED:
- *Electronically* – Report through WEDSS, including appropriate disease-specific tabs
  OR
- *Paper Copy* – Acute and Communicable Diseases Case Report (F-44151) AND Arbovirus Case Report Form

C. PUBLIC HEALTH INTERVENTIONS:
In accordance with Wisconsin Administrative rule DHS 145.05, local public health should follow the methods of control recommended in the current edition of *Control of Communicable Diseases Manual*, edited by David L. Heymann, published by the American Public Health Association.
- Source investigation by LHD to identify mosquito breeding sites near the probable location of the exposure
- Determine travel and possible date of exposures
- Educate patients on preventing mosquito bites and eliminating mosquito breeding sites
- For Powassan infection, identify if patient was exposed to ticks, places of exposure, and travel history approximately 14 days before illness of onset

III. CONTACTS FOR CONSULTATION

A. LOCAL HEALTH DEPARTMENT – REGIONAL OFFICES – TRIBAL AGENCIES:
http://www.dhs.wisconsin.gov/localhealth/index.htm

B. BCDER / COMMUNICABLE DISEASE EPIDEMIOLOGY SECTION: Diep (Zip) Hoang Johnson, Vectorborne Epidemiologist, at 608-267-0249

C. WISCONSIN STATE LABORATORY OF HYGIENE / VIROLOGY: (608) 262-0248

IV. RELATED REFERENCES

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